CLAIMS

1. An optical pickup device (20) comprising:

a single real laser light source (11);

a hologram member (13) for diffracting light emitted from said real laser light source (11) to form at least one imaginary laser light source; and

a light spot forming optical element (19) for receiving light from said hologram member (13) and forming a plurality of light spots (24, 25a-25c) on tracks of a recording medium (23),

wherein hologram patterns (15a-15c) of said hologram member (13) are determined so that diffraction light is given an inverse aberration of an aberration to be caused by optical elements (13, 18, 19) in an optical path from said real laser light source (11) to the recording medium (23).

2. An optical pickup device according to claim 1, wherein a column direction of the hologram patterns (15a-15c) of said hologram member (13) is aligned with a longer axis direction of a far field pattern of said real laser light source (11).

3. An optical pickup device according to claim 1 or 2, wherein said hologram member (13) is a phase hologram

SUB A2

Sub A2 Cncl'd

member, and the hologram pattern (15a-15c) for diffraction corresponding to each imaginary laser light source (12a-12c) is determined so that an intensity of diffraction light not used for light spot formation is reduced and a reduced amount of light is used as diffraction light for light spot formation.

4. An optical pickup device according to any one of claim 1, wherein a light spot (24) on the recording medium (23) formed by non-diffraction light from said real laser light source (11) is used for servo operations, and said hologram member (13) has a hologram pattern (14) which provides a uniform intensity of the servo light spot (24) in a whole light spot area.

5. An optical pickup device comprising:

a single real laser light source (11); and

a light spot forming optical element (19) for receiving light from said real laser light source (11) via a hologram member (13) and forming a servo light spot on a recording medium (23),

wherein the hologram member (13) has a hologram pattern (14) which provides a uniform intensity of the servo light spot in a whole servo light spot area.

6. An optical pickup device according to claim 1, wherein the hologram pattern is an amplitude hologram pattern with bright and dark interference fringes or a phase hologram pattern with binary or blazed grooves.

7. An optical pickup device according to claim 1, wherein the hologram pattern is recorded on the hologram member on a side of said real laser light source.

8. An optical pickup device according to claim 1, wherein the hologram pattern is recorded on the hologram pattern on an opposite side of said real laser light source.

9. An optical pickup device according to claim 1, wherein the hologram patterns are disposed at a predetermined interval in a column direction of said real laser light source and the imaginary laser light source.

10. An optical pickup device according to claim 1, wherein the hologram patterns are disposed partially overlapped in a column direction of said real laser light source and the imaginary laser light source.

11. An optical pickup device according to claim 3, wherein the hologram pattern for diffraction has curved patterns.

Sub A10 Cont'd

12. An optical pickup device according to claim 4, wherein the hologram pattern for diffraction has a plurality of grooves and an amount of light not to be diffracted is adjusted in accordance with depths of the grooves (54).

13. An optical pickup device according to claim 4, wherein the hologram pattern for diffraction has a plurality of grooves (54) and an amount of light not to be diffracted is adjusted in accordance with a ratio of a groove width to a non-groove width.

14. An optical pickup device according to claim 1, wherein said real laser light source is a semiconductor laser (10) having a single laser chip integrated therein.

15. An optical pickup device according to claim 1, wherein each of the hologram patterns gives the diffraction light a different aberration.

16. An optical pickup device according to claim 1, wherein each of the hologram patterns gives the diffraction light a same aberration.

Sub A11

17. A method of forming a plurality of imaginary laser light sources (12a, 12b, 12c....) by forming diffraction

hologram patterns on a hologram member by using light from optical elements, the method comprising the steps of:

disposing a first optical element (35a) in an optical path from a real laser light source (11) to a non-diffraction hologram pattern (14), the first optical element partially reflecting downward light from the real laser light source;

disposing n (n is a positive integer) optical elements (35b, 35c...) in an optical path of the partially reflected light, the n optical elements partially reflecting the partially reflected light toward the hologram member and reflecting downward residual light; and

disposing an optical element for reflecting the residual light toward the hologram member.

18. A method according to claim 17, wherein the first and n optical elements are half-mirrors, and the optical element at said last step is a full mirror.

19. A method of forming a plurality of imaginary laser light sources (12a, 12b, 12c....) by forming diffraction hologram patterns on a hologram member by using light emitted from pin holes, the method comprising the steps of:

transforming light from a real laser light source (11) into parallel light by a collimator lens (47); and

Sub A5 concld

disposing a member (50) having at least one pin hole (51a-51d) in an optical path of the parallel light.